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HOOKWORM DISEASE IN SOUTHERN CHINA.

By B. W. BROWN, SURGEON, United States Public Health Service.

In view of the action of the United States immigration authorities in requiring a rigid examination for hookworm infection of all aliens arriving in the United States, the question of the distribution of this disease in the Orient becomes of interest and importance to the public health.

It seems to be the general opinion among consular physicians and medical missionaries in this part of China that hookworm infection is prevalent in southern China, especially among the agricultural class. When it is taken into account that all crops in China are fertilized almost entirely with human excreta, that farmers work barefooted in this mixture, and that Chinamen drink freely of unfiltered water and eat uncooked vegetables, it is not surprising that they should become infected with intestinal parasites.

Dr. Bell, who has been connected with the Government Civil Hospital at Hongkong for a number of years, reports 7.5 per cent infected out of 253 Chinese examined, and 10.5 per cent infected out of 172 Hindus, and negative results in 159 examinations of Europeans.

The annual report of the colony of Hongkong for 1909 does not mention the disease. Dr. Francis Clark, the medical officer of health for Hongkong, states that in his opinion the practical immunity of the colony is due to the fact that all human excreta, instead of being used in the colony, is collected daily and shipped to Canton.

The South China Medical College at Canton reports that the neighborhood of Canton is infected, principally in the agricultural districts, but that no scientific statistics are available. Dr. Whyte, of the English Presbyterian Mission at Swatow, has done some scientific work on this subject, and he reports that the whole of his district is infected, the degree of infection being 74.5 per cent in the case of farmers and 54 per cent of the general population. These conclusions were based on the examination of 257 cases, too small a number from which to draw definite conclusions but indicating general infection of the country surrounding Swatow.

The most conclusive evidence of the infection of southern China is shown in the work of Drs. Grone, Aubrey, and Lindsay Wood, who, for the past three months, have been conducting the examinations of emigrants leaving Hongkong for the United States. They have examined to December 20, 1912, 556 persons for ancylostomiasis and have found 65 per cent infected.

These emigrants come from Canton and vicinity and the towns and districts near Hongkong. The town and district of Sun Ning, which is not very far from Hongkong, furnished 46 infected cases out of 102 examined. The statement of character of occupations of

those examined is not reliable, as the Chinese emigrant prefers to pass as a merchant or student rather than a laborer; but Dr. Aubrey stated that as a result of careful questioning he believed the large majority of those examined by him and found infected with hookworm were city born and belonged to the student class. It is interesting to note the number of cases found infected with other intestinal parasites. Drs. Grone, Aubrey, and Lindsay Wood report 368 cases of *Ascaris lumbricoides* (eel worm or stomach worm), 320 cases of *Trichocephalus dispar* (whip worm), and an occasional infection with *Clonorchis sinensis* (Chinese liver fluke), *Strongyloides stercoralis* (Cochin China worm), *Fasciolopsis buskii* (Busk's fluke), and *Oxyuris vermicularis* (pinworm).

The steamship companies are having all Chinese steerage passengers bound for the United States examined and are rejecting all found infected. Most of the infected ones are treated by the Hong-kong firm above mentioned, and after two examinations, if no eggs are found, they are certified for shipment. The following memorandum of method of examination and treatment was kindly given me by Dr. Aubrey, and I quote in full:

METHOD OF EXAMINATION FOR HOOKWORM OVA.

1. About 1 ounce of feces is taken and an emulsion made.
2. Emulsion is strained through fine mosquito netting into a test tube.
3. The test tube is allowed to stand till a sediment about an inch in height is formed at the bottom. (This sediment contains the whole of the egg content, equally distributed throughout it.)
4. The supernatant fluid is poured off and the sediment centrifugalized.
5. The supernatant fluid is again poured off and the sediment thoroughly mixed with half a test tube of water.
6. This test tube is allowed to sediment. (In this watery medium the eggs fall first to the bottom.)
7. As soon as the sediment appears on the bottom of the test tube a long narrow pipetteful is taken up and suspended vertically.
8. After a few minutes the eggs contained in the pipette fall to the bottom; a drop from the bottom is then examined.

This method gives a sediment which consists almost entirely of eggs and contains scarcely any fecal débris, and the whole egg content of the original ounce of material can be looked through on three or four slides.

TREATMENT.

Patients are starved throughout the treatment, only tea and Chinese soup being allowed. Drugs used:

Oil of eucalyptus, 30 minims.

Chloroform, 40 minims (increased later to 50 minims).

Castor oil, 10 drams.

The above is given in two doses with an hour's interval, or in 2-dram doses every 20 minutes.

Thymol, 15 to 120 grains a day, is given in a single dose or in doses repeated at various intervals.

The smaller doses of thymol were generally given on two consecutive days, the larger ones on one day only. A preliminary purge is given on the preceding day. The oil mixture has generally been tried first and subsequent treatments have alternated between oil and thymol.

The statement here given contains all the strictly scientific data to be obtained on this subject. While the number of cases is small the territory covered is of considerable extent, and the conditions of life and customs prevailing being the same throughout southern China it is highly probable that if the inhabitants of Swatow, Canton, Hong-kong, and the vicinity be infected with hookworm the infection is general in southern China.

ANTIMENINGITIS VACCINATION.

A note by WADE H. FROST, Passed Assistant Surgeon, United States Public Health Service.

Inoculation with killed cultures of the meningococcus has recently been advocated as a prophylactic for cerebrospinal meningitis, especially by Sophian.¹ He has used for this purpose cultures grown in glucose agar, killed by heating to 50° C. for one hour. He advocates three injections of 500 million, 1,000 million, and 1,000 million, respectively, at intervals of seven days.

As to the efficacy of this vaccination, Sophian and Black (loc. cit.) have shown by agglutination and complement-fixation tests that in man the vaccination causes the development of specific antibodies similar to those developed in the course of an attack of cerebrospinal meningitis, and presumably indicating a certain degree of immunity. They state that several hundred persons were vaccinated in Kansas City during the epidemic there in 1911, none of whom subsequently developed the disease. In the absence of comparative statistics this statement alone does not justify any conclusion as to the prophylactic value of the procedure. They also state that about 100 persons were vaccinated in Dallas, Tex., during an epidemic of meningitis in 1911. Two of these, nurses, each of whom had received two inoculations, developed cerebrospinal meningitis some weeks later. Both recovered.

On the whole their statements furnish no evidence of the prophylactic value of this vaccination, while they do indicate, by the instances cited above, that it does not afford absolute protection against infection.

At present an opinion as to the value of this vaccination can be based only on indirect evidence, viz, the development of antibodies in the blood of vaccinated persons, and by analogy, the efficacy of similar inoculations in the prevention of typhoid fever and bubonic plague.

¹ Sophian, A., and Black, J.: Prophylactic vaccination against meningitis, *Journal American Medical Association*, 1912, vol. 59, p. 527.